PATENT ABSTRACTS OF JAPAN

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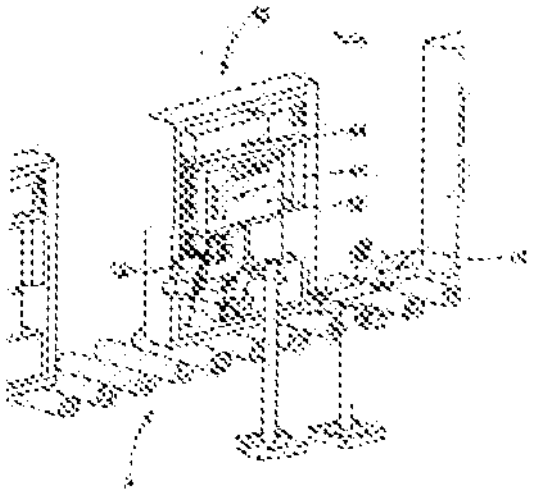
(54) GAME MACHINE INSPECTION DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a device capable of surely checking the sealed state of a seal pin in the main board case of a ball shooting game machine and requiring no manual operation for the check.

SOLUTION: A first camera 10 photographs a prescribed seal pin in a first seal part 44, and a second camera 12 photographs a prescribed seal pin in a second seal part 46. Whether the seal pin is in the sealing state or not is judged by judging whether the seal pin is protruded or not. In this judgment, a prescribed color is applied to the seal pin to perform the judgment on the basis of the size of the area where this color is detected. Otherwise, the shape may be extracted from the taken image to perform the judgment on the basis of the shape.



CLAIMS

[Claim(s)]

[Claim 1]Game machine test equipment which inspects a game machine which has the board case in which a control board which controls a game action was stored, comprising:
An imaging means which picturizes a sealing means provided in this board case.
A closure judging means which analyzes a picture picturized by this imaging means and judges whether the above-mentioned sealing means is a sealed condition.

[Claim 2]The game machine test equipment according to claim 1 which has a sealing pin in which the above-mentioned sealing means serves as protrusion state at the time of opening, and serves as a letter of inrush at the time of closure and with which the above-mentioned closure judging means is characterized by judging projection or inrush of this sealing pin.
[Claim 3]In order that the above-mentioned closure judgment part may picturize the above-mentioned sealing means correctly further, When it has an image pickup position judging means which judges whether a position for [of the above-mentioned imaging means] an image pick-up is the right and a position for an image pick-up is judged by this image pickup position judging means to be the right, The game machine test equipment according to claim 1 or 2 characterized by judging whether a sealing means is a sealed condition by this closure judging means.
[Claim 4]The game machine test equipment according to claim 1, 2, or 3, wherein the above-mentioned closure judging means and/or the above-mentioned image pickup position judging means judge according to area which a sealing pin in a picture picturized by the above-mentioned imaging means occupies.
[Claim 5]The game machine test equipment according to claim 4 computing area which a sealing pin occupies when the above-mentioned closure judging means and/or the above-mentioned image pickup position judging means compute predetermined color in a picture

picturized by the above-mentioned imaging means.

[Claim 5]The game machine test equipment according to claim 1, 2, or 3, wherein the above-mentioned closure judging means and/or the above-mentioned image pick-up position judging means detect shape in a picture picturized by the above-mentioned imaging means and judge according to this detected shape.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the test equipment of a game machine. It is related with the test equipment which inspects a pinball machine especially.

[0002]

[Description of the Prior Art]There were some in which two or more sealing pins a game machine and for the main board case being especially provided in the back in the pinball machine, and closing this main board case for the purpose of security to this main board case are provided. That is, in order to be able to perform making this main board case into an opened state by pushing in the sealing pin of the couple as it is impossible, and to make this main board case an opened state, operation of cutting a predetermined part is needed.

[0003]After changing into the state where the sealing pin of the predetermined couple was closed, as [open / a main board case] at the time of manufacture of a pinball machine, usually it strips.

[0004]

[Problem(s) to be Solved by the Invention]However, at the time of manufacture of a pinball machine, the inspection of whether the sealing pin predetermined [this] is closed is artificially conducted from the former with the naked eye, and there was fear of the leakage in an inspection of missing, in spite of not closing the sealing pin etc. The help for inspecting the sealed condition of a sealing pin will be needed.

[0005]Then, this invention can check the sealed condition of a sealing pin certainly, and an object of this invention is to provide the device which a check does not take a help.

[0006]

[Means for Solving the Problem]Are created in order that this invention may solve the above-

mentioned problem, and to the 1st. An imaging means which picturizes a sealing means which is game machine test equipment which inspects a game machine which has the board case in which a control board which controls a game action was stored, and was provided in this board case, it has a closure judging means which analyzes a picture picturized by this imaging means and judges whether the above-mentioned sealing means is a sealed condition.

[0007]Therefore, since it can be confirmed automatically whether a sealing means is a sealed condition, there is no leakage of a check and a check can be ensured. It becomes possible for an inspection not to take a help.

[0008]In the 1st composition of the above, in the 2nd, it has a sealing pin in which the above-mentioned sealing means serves as protrusion state at the time of opening, and serves as a letter of inrush at the time of closure, and the above-mentioned closure judging means judges projection or inrush of this sealing pin to it.

[0009]In order that the above-mentioned closure judgment part may picturize the above-mentioned sealing means correctly further in the 1st or 2nd composition of the above to the 3rd, When it has an image pickup position judging means which judges whether a position for [of the above-mentioned imaging means] an image pick-up is the right and a position for an image pick-up is judged by this image pickup position judging means to be the right, it is judged by this closure judging means whether a sealing means is a sealed condition. Therefore, since it judges a priori whether a position for [of an imaging means] an image pick-up is the right, it becomes] whether a sealing means is a sealed condition and] possible to inspect correctly.

[0010]To the 4th, the above-mentioned closure judging means and/or the above-mentioned image pickup position judging means judge in one from the above 1st to the 3rd of composition according to area which a sealing pin in a picture picturized by the above-mentioned imaging means occupies.

[0011]To the 5th, in the 4th composition of the above, when the above-mentioned closure judging means and/or the above-mentioned image pickup position judging means compute predetermined color in a picture picturized by the above-mentioned imaging means, area which a sealing pin occupies is computed.

[0012]In one from the above 1st to the 3rd of composition, to the 6th, the above-mentioned closure judging means and/or the above-mentioned image pickup position judging means detect shape in a picture picturized by the above-mentioned imaging means, and it judges to it according to this detected shape.

[0013]

[Embodiment of the invention]The example as an embodiment of the invention is described using a drawing. The pinball machine test equipment P of the 1st example based on this invention is provided with the following.

As shown in drawing 1, drawing 2, and drawing 3, it is the 1st camera 10.
The 2nd camera 12.
Control section 14.
The final controlling element 26, the indicator 28, and the conveyor control section 30.

[0014]This 1st camera 10 and 2nd camera 12 are installed near the transportation lines 3, and are set up picturize the predetermined part of the main board case 42 attached to the rear face of the pinball machine 40. The 1st camera 10 of the above and the 2nd camera 12 function as the above-mentioned imaging means.
[0015]Here, if these transportation lines 3 are explained, these transportation lines 3 have the 1st conveyor 5 and the 2nd conveyor 7, as shown in drawing 1 and drawing 2, and this 2nd conveyor 7 is formed in the downstream of the 1st conveyor 5. The air cylinder 9 is formed in this 2nd conveyor 7, and this 2nd conveyor 7 is movable in the transportation direction of the pinball machine 40, and a right-angled direction. That is, the pinball machine with which the inspection of the sealed condition of the sealing pin of the main board case 42 was conducted, and the error was detected by the inspection on the 1st conveyor 5, By moving this 2nd conveyor 7 in the direction with a right-angled transportation direction, it will be removed from original transporting lines and sealing operations will be given again.
[0016]This 1st conveyor 5 and the 2nd conveyor 7 are roller conveyors, and that operation is controlled by the conveyor control section 30.
[0017]Next, if the main board case 42 attached to the pinball machine 40 is explained, this main board case 42 is formed in general with resin, and two or more sealing pins are formed in the surface part 43 of this main board case 42. That is, as shown in drawing 4, the 1st sealed part 44 is formed in the longitudinal direction of this main board case 42, and as shown in drawing 5 (a), the four sealing pins 50, i.e., a sealing pin, the sealing pin 52, the sealing pin 54, and the sealing pin 56 are formed in this 1st sealed part 44 at it. The 2nd sealed part 46 is formed in the direction of the shorter side of this main board case 42, and as shown in drawing 4, as shown in drawing 5 (b), the four sealing pins 60, i.e., a sealing pin, the sealing pin 62, the sealing pin 64, and the sealing pin 66 are formed in it at this 2nd sealed part 46. Each of these sealing pins 50-56, 60-66 are approximately cylindrical pin parts projected from the main board case 42, and the peripheral part 70 of approximately ring form projects them on the periphery of these sealing pins 50-56, 60-66 in the surface part 43, and they are provided in it. This peripheral part 70 is united with the surface part 43 of the main board case 42.
[0018]By these sealing pins' 50-56, 60-66 being for forbidding the open operation of the main board case 42, and pushing in one sealing pin in the 1st sealed part 44, and one sealing pin in the 2nd sealed part 46, in order for the open operation of the main board case 42 to become impossible and to open the main board case 42, operation of cutting the predetermined region

in a sealing pin is needed.

[0019]These sealing pins 50-58, 60-68 are colored a color which is different in the surface part 43 of the main board case 42. For example, supposing the sealing pins 50-58, 60-68 are colored yellow, the surface part 43 of the main board case 42 is colored blue including the above-mentioned peripheral part 70.

[0020]If in charge of manufacture of a pinball machine, inspect whether one sealing pin in the 1st sealed part 44 is closed, one sealing pin in the 2nd sealing pin 46 is closed, and those sealing pins are closed by this pinball machine test equipment P, but, in this example, the sealing pin 56 and the sealing pin 66 shall be closed.

[0021]Therefore, the 1st camera 10 of the above is set so that the position of the sealing pin 50 in the main board case 42 may be picturized, and the 2nd camera 12 is set so that the position of the sealing pin 60 in the main board case 42 may be picturized. That is, if a predetermined inspection position is made to suspend the pinball machine 40 by controlling the 1st conveyor 8, exactly, the 1st camera 10 picturizes the position of the sealing pin 50, and the 2nd camera 12 can picturize the position of the sealing pin 60. Direction of the 1st camera 10 is set so that the position of the sealing pin 50 may be picturized from across, as shown in drawing 2, and as shown in drawing 1 and drawing 2, direction of the 2nd camera 12 is set so that the position of the sealing pin 60 may be picturized from across. This is for judging whether the sealing pin has become "-like. These 1st cameras 10 and the 2nd camera 12 are constituted by the CCD camera.

[0022]The 1st camera 10 and the 2nd camera 12 send the picturized picture information to the control section 14.

[0023]Next, the above-mentioned control section 14 is explained. This control section 14 is provided with the following.

As shown in drawing 3, it is the image capturing part 16.

Closure judgment part (closure judging means) 18.

Error signal outputting part 20.

The output control part 22 and the outputting part 24

[0024]Here, this image capturing part 16 functions as an interface for incorporating the picture information picturized with the 1st camera 10, and the picture information picturized with the 2nd camera 12.

[0025]This closure judgment part 18 is provided with the following.

Color extracting part 18a.

Image decision part 18b.

Here, in the picture information incorporated by the image capturing part 16, the color determination part 18a extracts the pixel of a predetermined color. The extraction of this

predetermined color can consider how to extract only that color using a colored filter. For example, when processing which subtracts the absolute value of hue difference with a predetermined color (for example, yellow) from chroma saturation about each pixel is performed and the result is over the threshold for the color determination which is each pixel, it judges with it being a color predetermined [this].

[0026]This image decision part 16b judges whether the rate that the extracted predetermined pixel occupies was computed and it is over the predetermined threshold. This threshold differs from the threshold for the color determination of each above-mentioned pixel.

[0027]The error signal outputting part 26 has a function which outputs an error signal, when judged with it being over a threshold by the described image judgment part 16b, an error signal is outputted, and conversely, when judged with it not being over a threshold, it does not output an error signal. An error signal will be outputted when judged with it being over at least one threshold among the sealing pins of the couple picturized. This error signal is outputted to the conveyor control section 30.

[0028]The output to the outputting part 24 is controlled, the outputting part 24 is controlled by this output control part 22, and the above-mentioned output control part 22 outputs predetermined information to the indicator 28.

[0029]The final controlling element 26 performs operation of the pinball machine test equipment P.

[0030]Next, operation of the above-mentioned pinball machine test equipment P is explained. First, detection of that the pinball machine 40 to be examined had the 1st conveyor 5 top conveyed, and the pinball machine 40 arrived at the predetermined inspection position on the 1st conveyor 5 will stop conveyance of the 1st conveyor 5. Thereby, the pinball machine 40 stops in a predetermined inspection position. In the main board case 42 of the pinball machine 40 conveyed, the sealing pin of a couple, i.e., the sealing pin 50 and the sealing pin 60, shall be pushed in essentially.

[0031]Then, the 1st camera 10 and the 2nd camera 12 picturize a photographic subject. That is, the 1st camera 10 picturizes the sealing pin 50, and, on the other hand, the 2nd camera 12 picturizes the sealing pin 60. The obtained picture information is incorporated into the control section 14 by the image capturing part 16 of the control section 14 by picturizing. That is, each of the picture information picturized with the 1st camera 10 and the picture information picturized with the 2nd camera 12 is incorporated. The incorporated picture information is sent to the closure judgment part 18.

[0032]In the closure judgment part 18, the color extracting part 18a extracts the pixel of a specific color (color) in picture information first. For example, when the color of the sealing pin is colored yellow, a yellow pixel is extracted in picture information.

[0033]And the image decision part 18b judges whether the color of this specification, i.e., the

number of yellow pixels, is over the threshold. In a predetermined case, based on the decision result of this image decision part 18b, the error signal outputting part 20 outputs an error signal.

[0034]That is, when the sealing pin 50 and the sealing pin 60 are closed correctly The sealing pin 50 and the sealing pin 60 are in the state where it was pushed in, and then, some of each sealing pins 50 and 60, it will be in the surface part 43 of the main board case 42, and the state where it hid in the peripheral part 70 especially, and in the picturized picture, the range of the color extracted, i.e., the range of the color (this example yellow) of the sealing pins 50 and 60, is set to the field R1 and S1 by which hatching was carried out in drawing 6, and many are not detected.

[0035]On the other hand, when neither the sealing pin 50 nor the sealing pin 60 is closed, it is in the state where the sealing pin 50 and the sealing pin 60 projected, and the range of the color extracted, i.e., the range of the color (this example yellow) of the sealing pins 50 and 60, is set to the field R2 and S2 by which hatching was carried out in drawing 7, and it will be mostly detected compared with the case where it is closed.

[0036]So, when the predetermined threshold is set up, it judges with being closed when the pixel number of the extracted color is not over this threshold and it is over the threshold, it judges with not being closed. By the picture information of the 1st camera 10, and the picture information of the 2nd camera 12, since the angles etc. which picturize a sealing pin differ, as a threshold, it will be set up about each. That is, it judges according to the area which the sealing pin in picture information occupies.

[0037]And the error signal outputting part 20 outputs an error signal based on the decision result of the image decision part 18b. Here, since the sealing pin 50 and the sealing pin 60 must be closed by each, when [of the sealing pin 50 and the sealing pin 60 / which it is over the threshold about either at least] it is got blocked and judged with not being closed, they will output an error signal.

[0038]As contents displayed on the indicator 28, the picture information incorporated into the image capturing part 16 colors, displays and displays the portion also about the specific color which was displayed on the indicator 28 via the output control part 22 and the outputting part 24, and was extracted in the closure judgment part 18. When an error signal is outputted, based on the information from the error signal outputting part 20, it indicates that the error was detected. Thereby, the operator can know that the error was detected.

[0039]The pinball machine 40 which the inspection ended is sent to the 2nd conveyor 7 from the 1st conveyor 5. And when an error is not detected in an inspection, it is downstream conveyed as it is from the 2nd conveyor 7. On the other hand, when an error is detected, the error signal from the error signal outputting part 20 is sent to the conveyor control section 30, and the conveyor control section 30 drives the air cylinder 9, and moves the 2nd conveyor 7.

Thereby, the pinball machine 40 is not conveyed by the downstream but is again returned to the work of a previous process. That is, it is returned to the process of doing this work which closes a sealing pin.

[0040]Since it can be inspected automatically whether the predetermined sealing pin is closed, it becomes unnecessary as mentioned above, to be able to prevent the mistake of an inspection of the sealed condition of a sealing pin, and to inspect the sealed condition of a sealing pin according to artificial work in the pinball machine test equipment P of this example.

[0041]Next, the pinball machine test equipment in the 2nd example is explained. Although the pinball machine test equipment of this 2nd example is the composition of the approximately said appearance as the pinball machine test equipment of the 1st example of the above, the composition of the closure judgment part 18 differs. That is, when the 1st example of the above extracts a predetermined color from picture information, the sealed condition is judged, but in being this example, it judges a sealed condition by extracting shape.

[0042]That is, the shape extraction part 18c and the image decision part 18d are formed in the closure judgment part 18 of the control section 14 in the pinball machine test equipment of this example. In the picture information incorporated by the image capturing part 16, this shape extraction part 18c extracts shape. That is, this shape extraction part 18c extracts shape (outline) by processing edge detection etc. about the incorporated picture information.

[0043]And in the image decision part 18d, it is judged whether the data of shape in case the sealing pin is closed correctly is held beforehand, and the sealing pin is closed from the degree whose data of two shape corresponds as compared with the data of the extracted shape. That is, about the sealing pin 50, it is judged whether the sealing pin is closed by storing the data of shape in case this sealing pin 50 is closed correctly, and comparing the data of the shape with the data of the extracted shape. It is judged whether the sealing pin is closed by storing the data of shape in case this sealing pin 60 is closed correctly also about the sealing pin 60, and comparing the data of the shape with the data of the extracted shape.

[0044]For example, if the shape is extracted when the sealing pin 50 is closed, if the sealing pin 50 is taken for an example, when it comes to be shown in drawing 9 (a) and the sealing pin 50 is not closed, if the shape is extracted, it will become like drawing 9 (b). Therefore, it becomes possible by storing beforehand the data of shape as shown in drawing 9 (a), and comparing with this to judge whether the sealing pin is closed. The same may be said of the case of the sealing pin 60.

[0045]It may be made to judge whether the sealing pin is closed by storing the data of shape in case the sealing pin is closed correctly, and the data of shape in case the sealing pin is not closed, and judging which the data of the extracted shape resembles.

[0046]Although explained as what judges whether the sealing pin is closed in explanation of the 1st above-mentioned example and the 2nd example based on the picture information

incorporated with the 1st camera 10 and the 2nd camera 12. After judging whether the sealing pin which it is going to judge beforehand is picturized correctly, it may be made to judge whether the sealing pin is closed.]

[0047]That is, although the composition of the control section 14 in that case is the same as that of the case of the 1st example of the above, and the 2nd example, and abbreviation, as shown in drawing 10, it differs in that the image pickup position judgment part (image pickup position judging means) 17 is formed in the preceding paragraph of the closure judgment part 18.

[0048]That is, this image pickup position judgment part 17 judges whether the sealing pin is photoed correctly based on the picture information incorporated by the image capturing part 16. For example, shape is extracted from picture information and it judges [whether the shape of the outline of the maximum outline of a peripheral part is detected, and]. For example, since picture information as shown in drawing 11 (a) will be incorporated when the position of the sealing pin is picturized correctly if the sealing pin 50 is taken for an example, the shape shown in drawing 11 (b) should be detected at least. On the other hand, when the position of a sealing pin shifts and is picturized, the shape which comes to be shown in drawing 12 (a) and shown in drawing 11 (b) as a picture captured, for example is not detected. Therefore, what is necessary is whether the shape in which shape as shown in drawing 11 (b) was contained is detected, and just to judge. On the other hand, the sealing pin 50 is judged [whether shape as shown in drawing 12 (b) is detected, and].

[0049]The field of the predetermined color in picture information may be detected, and it may be judged from the area and the outline of a field of the color whether the sealing pin is photoed correctly. That is, if the sealing pin 50 is taken for an example, an image pickup position shifts, and when picture information as shown in drawing 12 (a) is incorporated, the field of the color of a sealing pin will become small. Then, a threshold still smaller than the case where a sealing pin is a sealed condition is set up, and when the area of the color extracted rather than the threshold is small, the image pickup position has shifted and it judges with the sealing pin not being picturized correctly. In a picture when the picture of the sealing pin is picturized correctly, as shown in the field R1 by which hatching was carried out for drawing 5 (a) as a picture of the field of a sealing pin. Or since the image as shown in the field R2 to which hatching of drawing 7 (a) was carried out should be captured, when the shape of the field of the color of a sealing pin corresponds to the neither, it judges with the image pickup position of a sealing pin having shifted. For example, the image pickup position has shifted, and when picture information as shown in drawing 12 (a) is incorporated, the field of the color of a sealing pin serves as shape as shown in the hatching field R3 of drawing 13, and differs from drawing 5 (a) and drawing 7 (a).

[0050]And when judged with the sealing pin being picturized correctly, it is judged by the

closure judgment part 18 whether the sealing pin is closed. Since it is the same as that of the 1st example of the above, and the 2nd example, subsequent processings are omitted. On the other hand, when the sealing pin is not picturized correctly, direction of the 1st camera 11 and the 2nd camera 12 is reset, or, in the case of a lateral transition, the 1st conveyor 5 is moved manually, and a gap is corrected.

[0051]Thus, by detecting a gap of an image pickup position a priori, the judgment which was [about the sealed condition of a sealing pin] mistaken can be prevented, and it becomes possible to perform the exact judgment about a sealed condition. That is, when it judges with the pixel number of the predetermined color in the captured picture like [in the case of the 1st example of the above] especially, in spite of not closing the sealing pin, there is a possibility that it may be judged with it being a sealed condition accidentally noting that there are few pixel numbers of a color predetermined [this] than a threshold, when the image pickup position has shifted, but. By judging whether the image pickup position has shifted a priori, it becomes possible to prevent such fear.

[0052]Although the above-mentioned example explained as what shall close the sealing pin 50 and closes the sealing pin 60 in the 2nd sealed part 46 in the 1st sealed part 44 as a sealing pin closed. Even if it is a case where it is not restricted to this, but close other sealing pins in the 1st sealed part 44, and other sealing pins in the 2nd sealed part 46 are closed, the above-mentioned contents are the same. Only the portion (sealing pin) closed at the time of shipment may be colored a color different from other portions.

[0053]Although the example explained taking the case of the pinball machine, i.e., a pachinko machine, as a game machine to be examined, if it is a game machine which has a case member which is not restricted to this as a game machine and has a sealing pin, the application to other game machines, for example, a ball arranging machine, a mahjong ball game machine, a rotary drum type game machine, etc. is possible.

[0054]

[Effect of the invention]Since it can be confirmed automatically whether a sealing means is a sealed condition according to the game machine test equipment based on this invention, there is no leakage of a check and a check can be ensured. It becomes possible for an inspection not to take a help.

[0055]Since it confirms whether the position for [of an imaging means] an image pick-up is right in having an image pickup position judging means, it becomes [whether a sealing means is a sealed condition and] possible to inspect correctly.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a top view showing the composition of pinball machine test equipment based on the example of this invention.
[Drawing 2]It is a perspective view showing the composition of the important section of pinball machine test equipment based on the example of this invention.
[Drawing 3]It is a block diagram showing the composition of the important section of pinball machine test equipment based on the example of this invention.
[Drawing 4]It is a perspective view showing the composition of the main board case attached to a pinball machine.
[Drawing 5]It is an important section perspective view showing the important section of a main board case.
[Drawing 6]It is an explanatory view for explaining operation of pinball machine test equipment.

[Drawing 7]It is an explanatory view for explaining operation of pinball machine test equipment.

[Drawing 8]It is a block diagram showing the composition of the important section of pinball machine test equipment based on other examples of this invention.
[Drawing 9]It is an explanatory view for explaining operation of pinball machine test equipment.

[Drawing 10]It is a block diagram showing the composition of the important section of pinball machine test equipment based on other examples of this invention.
[Drawing 11]It is an explanatory view for explaining operation of pinball machine test equipment.
[Drawing 12]It is an explanatory view for explaining operation of pinball machine test equipment.

[Drawing 13]It is an explanatory view for explaining operation of pinball machine test equipment.

[Description of Notations]

3 Transportation lines

5 The 1st conveyer

7 The 2nd conveyer

10 The 1st camera

12 The 2nd camera

14 Control section

16 Image capturing part

18 Closure judgment part

20 Error signal outputting part

42 Main board case

43 Surface part

44 The 1st sealed part

46 The 2nd sealed part

50, 52, 54, 56, 60, 62, 64, 66 sealing pins

70 Peripheral part

[Translation done.]

* NOTICES *

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem]Are created in order that this invention may solve the above-mentioned problem, and to the 1st. An imaging means which picturizes a sealing means which is game machine test equipment which inspects a game machine which has the board case in which a control board which controls a game action was stored, and was provided in this board case, It has a closure judging means which analyzes a picture picturized by this imaging means and judges whether the above-mentioned sealing means is a sealed condition
[0007]Therefore, since it can be confirmed automatically whether a sealing means is a sealed condition, there is no leakage of a check and a check can be ensured. It becomes possible for an inspection not to take a help.
[0008]In the 1st composition of the above, In the 2nd, it has a sealing pin in which the above-mentioned sealing means serves as protrusion state at the time of opening, and serves as a letter of inrush at the time of closure, and the above-mentioned closure judging means judges projection or inrush of this sealing pin to it.
[0009]In order that the above-mentioned closure judgment part may picturize the above-mentioned sealing means correctly further in the 1st or 2nd composition of the above to the 3rd, When it has an image pickup position judging means which judges whether a position for { of the above-mentioned imaging means } an image pick-up is the right and a position for an image pick-up is judged by this image pickup position judging means to be the right, it is judged by this closure judging means whether a sealing means is a sealed condition. Therefore, since it judges a priori whether a position for { of an imaging means } an image pick-up is the right, it becomes { whether a sealing means is a sealed condition and } possible to inspect correctly.
[0010]To the 4th, the above-mentioned closure judging means and/or the above-mentioned image pickup position judging means judge in one from the above 1st to the 3rd of composition according to area which a sealing pin in a picture picturized by the above-mentioned imaging

means occupies.

[0011]To the 5th, in the 4th composition of the above, when the above-mentioned closure judging means and/or the above-mentioned image pickup position judging means computs predetermined color in a picture picturized by the above-mentioned imaging means, area which a sealing pin occupies is computed.

[0012]In one from the above 1st to the 3rd of composition, to the 6th, the above-mentioned closure judging means and/or the above-mentioned image pickup position judging means detect shape in a picture picturized by the above-mentioned imaging means, and it judges to it according to this detected shape.

[0013]

[Embodiment of the invention]The example as an embodiment of the invention is described using a drawing. The pinball machine test equipment F of the 1st example based on this invention is provided with the following.

As shown in drawing 1, drawing 2, and drawing 3, it is the 1st camera 10.

The 2nd camera 12.

Control section 14.

The final controlling element 26, the indicator 28, and the conveyor control section 30.

[0014]The 1st camera 10 and 2nd camera 12 are installed near the transportation lines 3, and are set up picturize the predetermined part of the main board case 42 attached to the rear face of the pinball machine 40. The 1st camera 10 of the above and the 2nd camera 12 function as the above-mentioned imaging means

[0015]Here, if these transportation lines 3 are explained, these transportation lines 3 have the 1st conveyor 5 and the 2nd conveyor 7, as shown in drawing 1 and drawing 2, and this 2nd conveyor 7 is formed in the downstream of the 1st conveyor 5. The air cylinder 9 is formed in this 2nd conveyor 7, and this 2nd conveyor 7 is movable in the transportation direction of the pinball machine 40, and a right-angled direction. That is, the pinball machine with which the inspection of the sealed condition of the sealing pin of the main board case 42 was conducted, and the error was detected by the inspection on the 1st conveyor 5, By moving this 2nd conveyor 7 in the direction with a right-angled transportation direction, it will be removed from original transporting lines and sealing operations will be given again.

[0016]The 1st conveyor 5 and the 2nd conveyor 7 are roller conveyors, and that operation is controlled by the conveyor control section 30

[0017]Next, if the main board case 42 attached to the pinball machine 40 is explained, this main board case 42 is formed in general with resin, and two or more sealing pins are formed in the surface part 43 of this main board case 42. That is, as shown in drawing 4, the 1st sealed part 44 is formed in the longitudinal direction of this main board case 42, and as shown in

drawing 5 (a), the four sealing pins 50, i.e., a sealing pin, the sealing pin 52, the sealing pin 54, and the sealing pin 56 are formed in this 1st sealed part 44 at it. The 2nd sealed part 46 is formed in the direction of the shorter side of this main board case 42, and as shown in drawing 4, as shown in drawing 5 (b), the four sealing pins 60, i.e , a sealing pin, the sealing pin 62, the sealing pin 64, and the sealing pin 66 are formed in it at this 2nd sealed part 46. Each of these sealing pins 50-56, 60-66 are approximately cylindrical pin parts projected from the main board case 42, and the peripheral part 70 of approximately ring form projects them on the periphery of these sealing pins 50-56, 60-66 in the surface part 43, and they are provided in it. This peripheral part 70 is united with the surface part 43 of the main board case 42.

[0018]By these sealing pins' 50-56, 60-66 being for forbidding the open operation of the main board case 42, and pushing in one sealing pin in the 1st sealed part 44, and one sealing pin in the 2nd sealed part 46, in order for the open operation of the main board case 42 to become impossible and to open the main board case 42, operation of cutting the predetermined region in a sealing pin is needed.

[0019]These sealing pins 50-56, 60-66 are colored a color which is different in the surface part 43 of the main board case 42. For example, supposing the sealing pins 50-56, 60-66 are colored yellow, the surface part 43 of the main board case 42 is colored blue including the above-mentioned peripheral part 70.

[0020]If in charge of manufacture of a pinball machine, inspect whether one sealing pin in the 1st sealed part 44 is closed, one sealing pin in the 2nd sealing pin 46 is closed, and those sealing pins are closed by this pinball machine test equipment P, but, in this example the sealing pin 56 and the sealing pin 66 shall be closed.

[0021]Therefore, the 1st camera 10 of the above is set so that the position of the sealing pin 50 in the main board case 42 may be picturized, and the 2nd camera 12 is set so that the position of the sealing pin 60 in the main board case 42 may be picturized. That is, if a predetermined inspection position is made to suspend the pinball machine 40 by controlling the 1st conveyor 5, exactly, the 1st camera 10 picturizes the position of the sealing pin 50, and the 2nd camera 12 can picturize the position of the sealing pin 60. Direction of the 1st camera 10 is set so that the position of the sealing pin 50 may be picturized from across, as shown in drawing 2, and as shown in drawing 1 and drawing 2, direction of the 2nd camera 12 is set so that the position of the sealing pin 60 may be picturized from across. This is for judging whether the sealing pin has become "-like. These 1st cameras 10 and the 2nd camera 12 are constituted by the CCD camera.

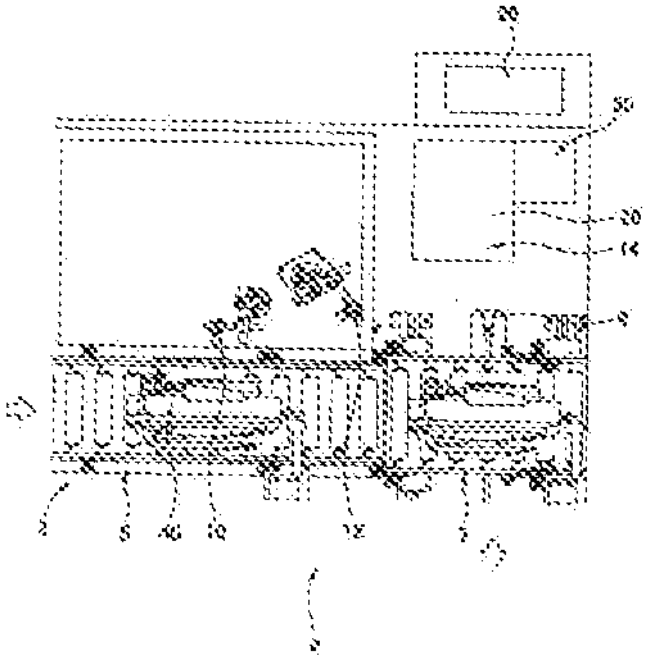
[0022]The 1st camera 10 and the 2nd camera 12 send the picturized picture information to the control section 14.

[0023]Next, the above-mentioned control section 14 is explained. These control sections 14 are the image capturing part 16 and a closure judgment part, as shown in drawing 3.

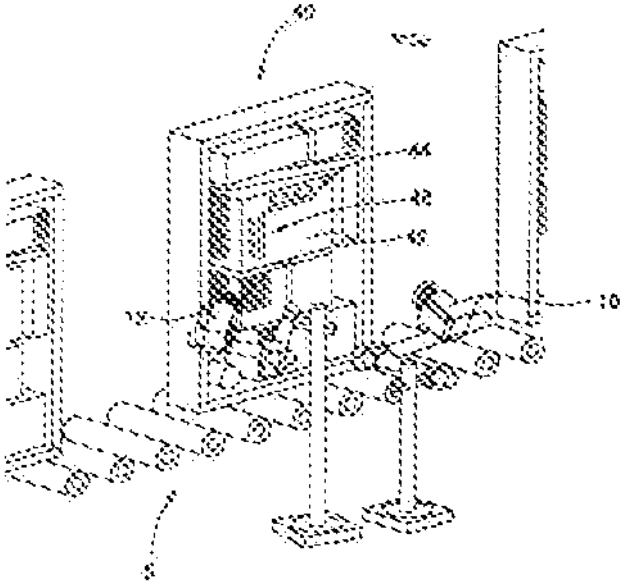
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

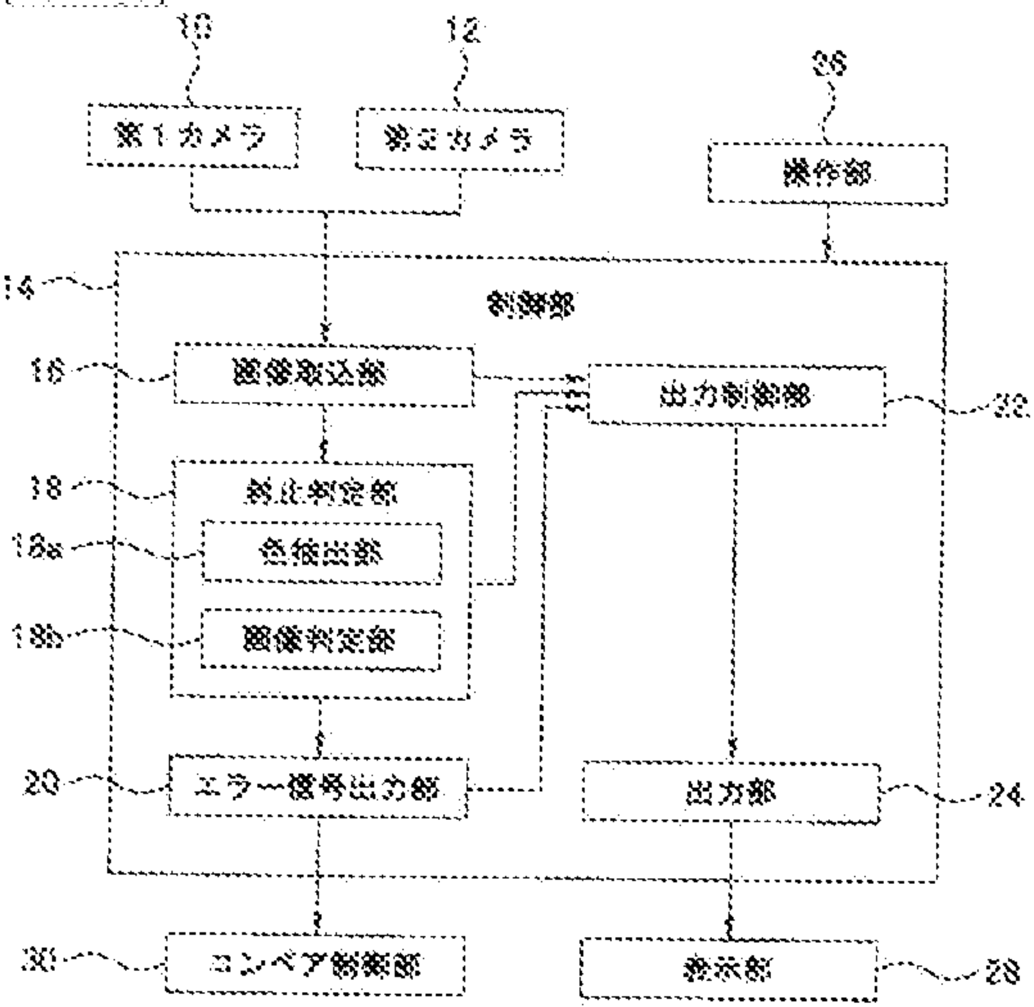
[Drawing 1]



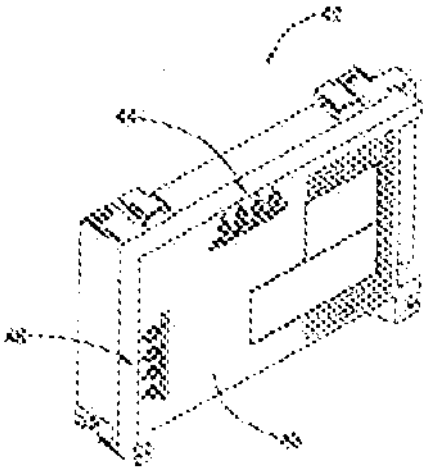
[Drawing 2]



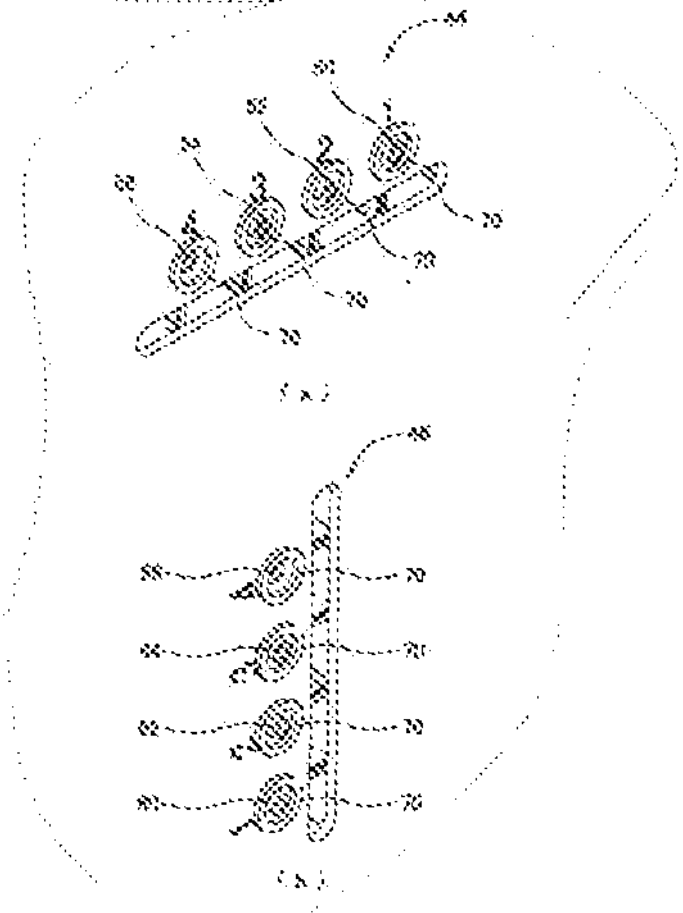
[Drawing 3]



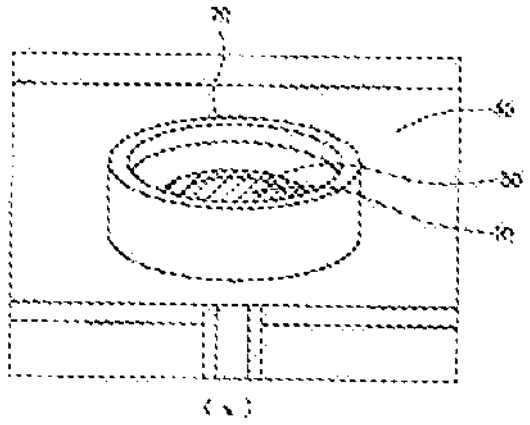
[Drawing 4]



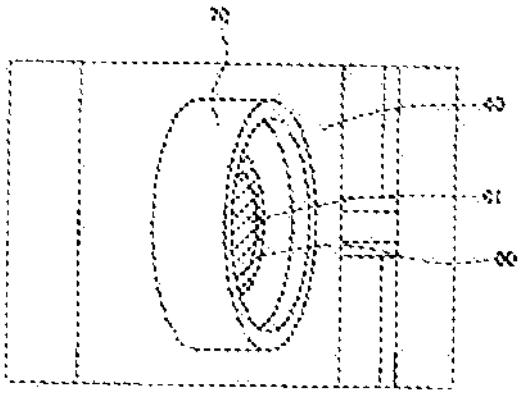
[Drawing 5]



[Drawing 6]

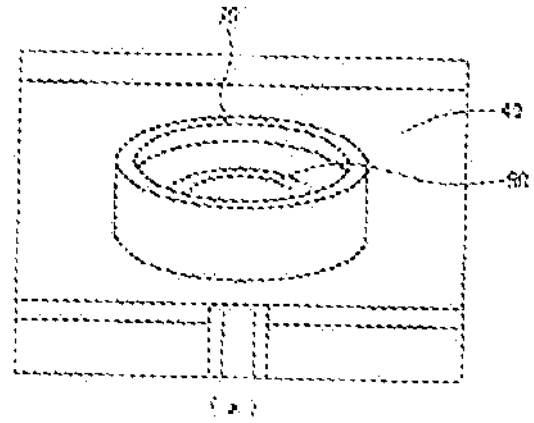


(a)



(b)

[Drawing 3]



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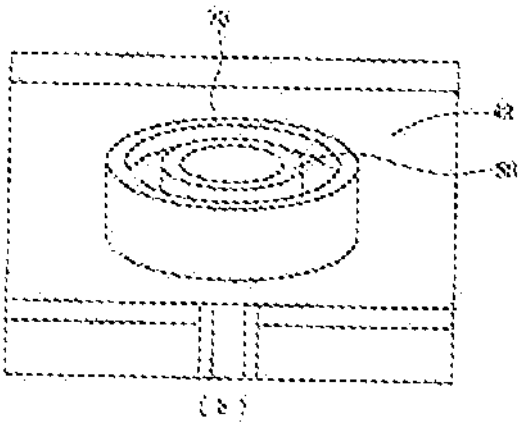
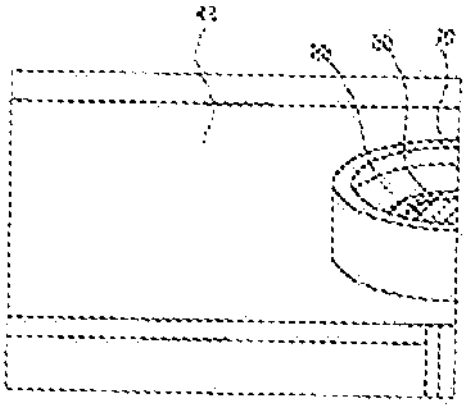
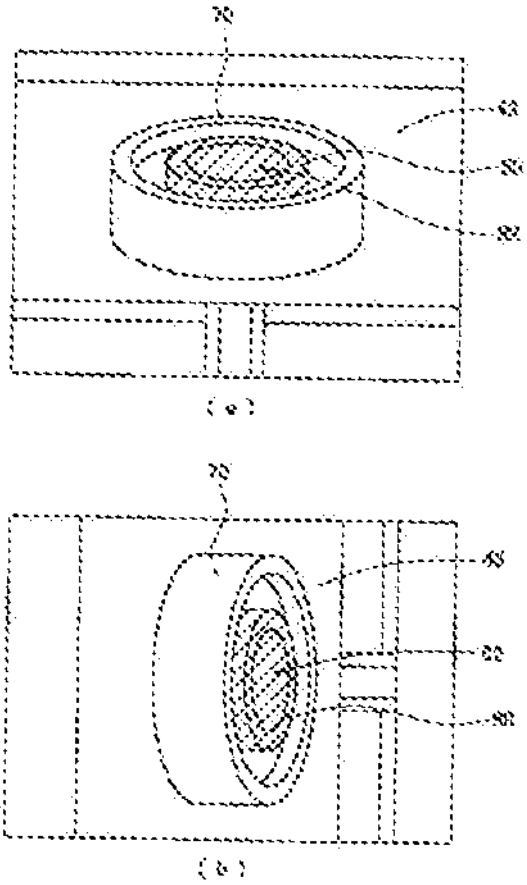


(b)

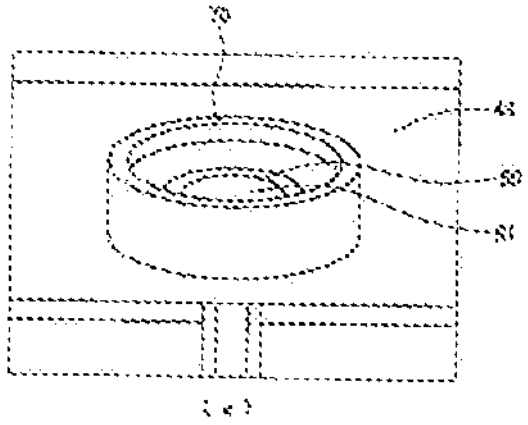
[Drawing 13]



[Drawing 7]



[Drawing 11]



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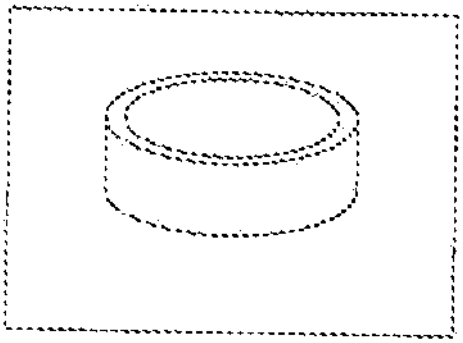
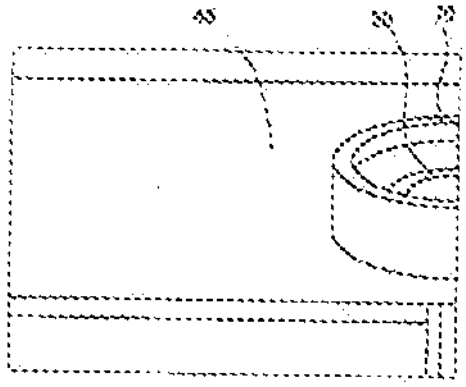


(b)

[Drawing 12]



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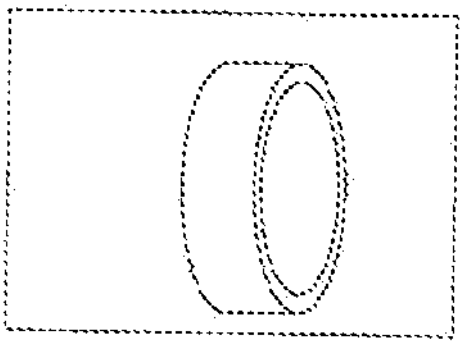
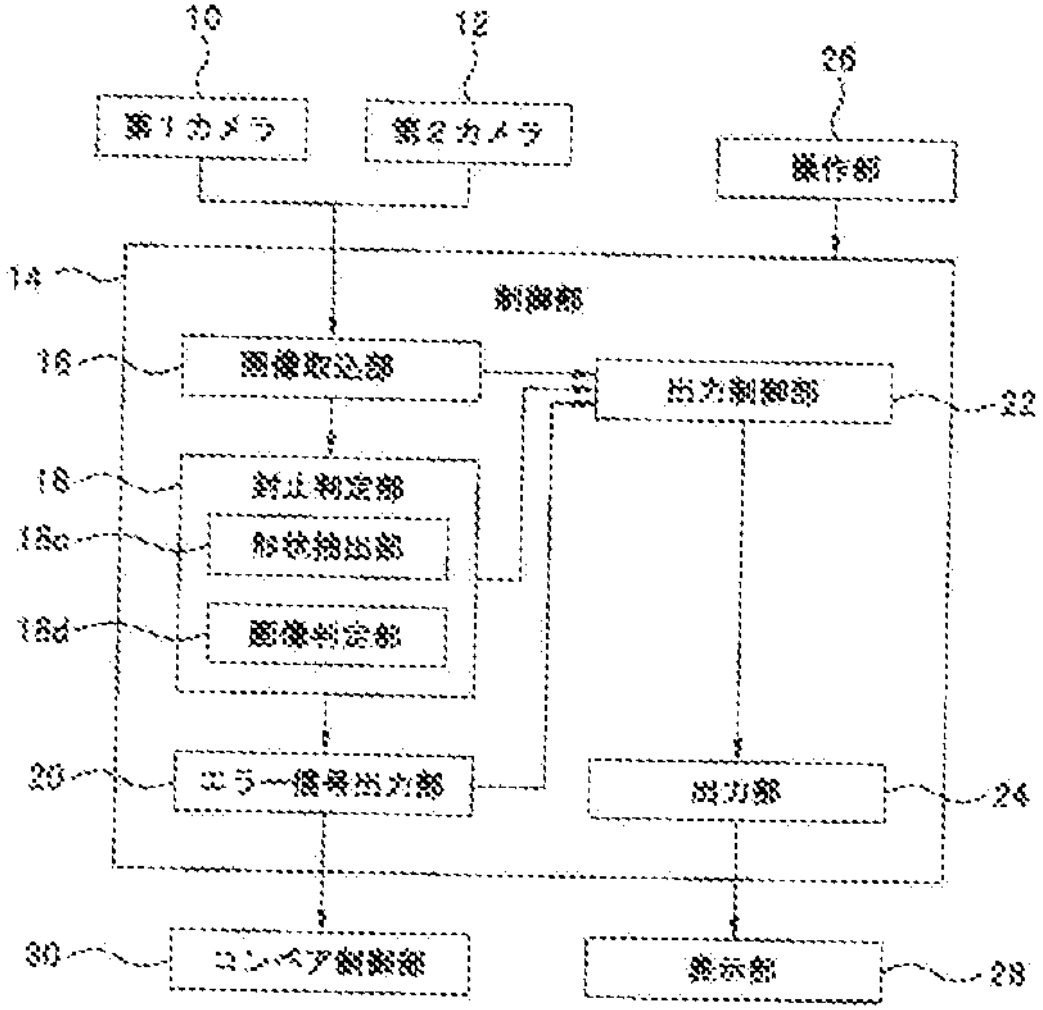


(b)

[Drawing 8]


10
12
26
第1カメラ
第2カメラ
操作部
14
制御部
16
画像取込部
出力制御部
22
18
対応判定部
18c
特徴抽出部
18d
画像判定部
20
ユーザー指示出力部
設定部
24
30
コンペア制御部
表示部
28

[Drawing 19]